

Phase behavior based on CH₄ replacement reaction by N₂-CO₂ gas mixtures

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Natural gas hydrates (NGH) formation condition comes close to temperature and pressure of the surrounding ocean floor. For this reason, in the similar way to generation of conventional fossil fuels, the vast amount of natural gas (mainly CH₄) as been stored as gas hydrate in deep-sea sediments. This type of energy sources has a great expectation for alternative fuels. To achieve this, CH₄ tried to be replaced by N₂-CO₂ gas mixtures as a way of exploiting NGH and carbon sequestration. The first concern of practical replacement reaction is a pressure and temperature condition of hydrate bearing sediments. In usual, pressure and temperature are related to depth of water and geothermal gradient, respectively. Therefore, all the data of CH₄ hydrate and N₂-CO₂ gas mixtures should be presented in *p*-*T* diagram. In the present study, phase behavior of CH₄ hydrate and N₂-CO₂ gas mixtures will be dealt with based on the actual substitution reaction in deep-seabed.